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ABSTRACT

This paper develops a theoretical context for the concept that visual literacy involves a specific type of information processing that has been discussed in the literature on symbolism and epistemology for a number of years. Literacy is discussed first, as a general process of information processing involving the generation of knowledge through the mediation of symbolic forms; this allows the concept to be applied to nonlanguage symbols. A distinction is made between two types of knowledge, the theoretical symbolic (the domain of language) and the qualitative symbolic (the nonlingual symbol). The perceptual context for the qualitative symbolic is discussed. Perception is treated as the basis for communication, which involves attitudes, knowledge, communication skills between individuals, and the social and cultural context in which these attributes are located; this leads to the assertion that our knowledge of reality is governed by our visual literacy. The notion of levels of abstraction is then introduced and related to both the theoretical symbolic and the qualitative symbolic and, in turn, to the concept of visual literacy. (AA)

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THE THEORETICAL CONTEXT OF VISUAL LITERACY:

UNDERSTANDING THE NATURE OF TWO TYPES OF KNOWLEDGE

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PART I VISUAL LITERACY, THE THEORETICAL SYMBOL AND MEANING

INTRODUCTION

Visual Literacy has a much wider and richer theoretical context than is usually brought to the attention of the people trying to understand the concept. We feel that if this wider context is made available, then a greater degree of understanding and acceptance of the educational implications will occur.

It is absolutely necessary, first of all, that educators understand that when they react to visual literacy they are really reacting to a form of information processing. This is the focus of literacy; information getting. But in visual literacy, it must be realized that a particular sector of the total spectrum of the human intellect is used. The point to be understood is that there are basically two categories of complementary knowledge encoded by the nervous system and these are encoded and retrieved by the use of symbols. We also have two different types of complementary symbols cueing these two different types of knowledge.

EXPANDING THE LITERACY CONCEPT

A mistake is truly made by people attempting to explain visual literacy if the new concept is introduced to practitioners in isolation, without any relationship to things known; to a host of information that could be used to understand where and why visual literacy has a place in the knowledge of the educating professions. As F. Smith[1] points out:

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[1]Frank Smith, Comprehension and Learning, (New York: Holt, Rinehart and Winston, 1975) p. 10.

> Comprehension means relating new experience to the already known (or) comprehension means making sense. I shall in fact often use the term "making sense" rather than "comprehension" because "making sense" is more general. The word "comprehension" is often assumed to refer specifically to language.

We wish to point out that Frank Smith in this last quote specifically points to the situation where "making sense" must not only refer back to what is already known but he also makes reference to a situation where "making sense" would include elements other than lingual ones. E. M. Rogers[2] in discussing innovation speaks more directly to the point being made.

> Old ideas are the main tools with which new ideas can be assessed. One cannot deal with an innovation except on the basis of the familiar and the old-fashioned. The rate of adoption of a new idea is affected by the old idea that supersedes.

New concepts, do not appear out of isolation. In fact, by the very nature of the growth of an area of knowledge, new concepts grow out of old subject matter. The boundaries which determine an area of study demand it.[3]

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[2]E. M. Rogers, Diffusion of Innovations (New York: The Free Press, 1962) p. 127.

[3]The boundaries of a discipline of knowledge set the conditions for its growth. In a basic science, scientists research the data of the area to create growth from within the discipline. Marine biologists research marine life and expand the knowledge of marine life. On the other hand applied sciences, generally the professions, deal in the main, with the problems of people. In the specific case of educators, the pedagogical problems of people is the professional focus; how to facilitate the learning process. Applied sciences rely to a great extent on the research generated by basic scientists. In other words, the professional problem area increases its expertise by using knowledge from outside the area; it applies basic theory to solve problems of people. Thus the concept of visual literacy takes its bases from a variety of the disciplines of knowledge. For an elaboration of this point see Earl D. Clark, "The Reading Professor as Applied Scientist" Reading World, Oct. 1975, pp. 23-37, and Steven D. Barley, "A New Look at the Loom of Visual Literacy," (ED 057-585, 17 pp.)

There are, of course, cases of great intuitive jumps where a new concept is a new way of looking at the old knowledge or a new way of organizing it. For instance, we might use the example in marine biology. Looking at a whale as a big fish might cause us a great deal of difficulty in explaining its behavior. Finding the whale to be a mammal, we see it differently. Such a reconceptualization accounted for the behavior of the whale. Such insights however, no matter how advanced in their thinking or discovery, are tied to other knowledge available in the field.

Visual literacy is in reality not a great intuitive jump but rather it is a creative and cumulative result of research on a type of information processing that has been discussed, in the literature on symbolism and epistemology, for a number of years. It is this theoretical context that ought to give more validity and widen educational implications to visual literacy.

In this presentation, we will compare two categories of symbols but will elaborate the non-lingual category, a symbol which educators have toyed with but have not taken completely seriously. This category has been called the qualitative symbol; qualities of situations themselves that are symbolic (see later discussion on nature of symbol) but non-lingual and can be encoded in the nervous system, stored and brought to awareness by symbols. If symbols reflect the content of the intellect (encoded knowledge and processing tools) then the qualitative symbolic has a pedagogical consequence greater than merely being an enrichment, a flair, or a reinforcement of the lingual symbol.

THEORETICAL CONTEXT

In suggesting a closer look at the nature and comparison of two categories of symbols, we are attempting to present a broader theoretical context for the concept of visual literacy. Theory is a language statement; a connecting of explanatory generalizations. These generalizations are composed of stated relationships between concepts. In the limitations of this presentation we will emphasize theoretical concepts so as to present a limited framework. From such a conceptual framefork fruitful explanations can be generated for student activities that are used with the qualitative modalities and we also hope to encourage consideration of some new methods in symbol manipulation.[4]

The first concept is a basic one. It is the concept of information processing by use of non-lingual symbolism. It is the assumption that language and thought are not always one and the same. Thought takes place in units of meaning and meaning may take different forms. This is a basic concept which is crucial in understanding visual literacy.

Surprisingly, the recent emphasis on the translation of linguistic and psycholinguistic theory in order to improve language-centered (reading and language arts) instruction in the schools has helped

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[4]This emphasis on symbols themselves is not new. Susan E. Blow, historically well-known in primary education, especially in the St. Louis, Missouri area, wrote of the significance of symbols in her book, Symbolic Education (New York: D. Appleton and Company, 1906). Her emphasis, however, had strong Idealist overtones characteristic of the spiritualistic emphasis of the era. And, interestingly enough, her interpretation of Froebel's pedagogical theory regarding early childhood behavior tends toward analogical presentation, which she herself mentions, rather than the representational nature of theoretical symbolism. The play of childhood is symbolic but on the order of analog models. They model adult cultural forms as a form of visual presentation. "Children can show without words that they understand some ideas by the way they manipulate objects in play and in problematic situations", (Smith and Goodman, et al., 1970, p. 113).

generate, in addition to other thrusts, an interest in looking deeper into the basic concepts of information processing. Not surprising, the concepts of symbol and meaning are not only basic to an understanding of information processing but also to the visual literacy movement.[5]

Although the concepts of symbol and meaning have long been of interest to philosophers of language,[6] pedagogy has just recently developed to a point where educators, because of theory-into-practice problems, need to gain intellectual control over these concepts. With this emphasis on theoretical understanding of these basic concepts and their relationship to different kinds of information processing, the media changes in educative systems will have a firm foundation and consistency, not always evident in the present practices.

We have found that people "messing around" with the implications of visual literacy seem to attack it as a way of probing. The probing is a form of defensive thrust reflective of its supposed threat to the dominate language modality of schooling. They attack it first at the sematic level to see if the very labeling will hold water. Of course "visual" is quite descriptive of the enterprise and a word quite familiar in the lingual symbol processing programs of schools. What is not apparent to most casual critics is that if they went further than the one level of superficial meaning of the term 'visual', beyond the sense

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[5]For examples, see Earl D. Clark, ed., Language-Related Instruction: Readings in Semantic and Linguistic Concepts (New York: Simon and Schuster, 1970); C. L. Wrenn, Word and Symbol: Studies in English Language (London: Longmans, Green and Company, Ltd., 1967); Robert F. Terwilliger Meaning and Mind: A Study in the Psychology of Language (New York: Oxford University Press, 1968).

[6]William P. Alston, Philosophy of Language (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964).

of seeing language symbols, they might be even more serious in their probing. Then oftentimes (not always) overlook the word "visual" as referring to a mode of information processing, to an epistemological quest carried on by non-lingual symbolic mediation.

But the most vulnerable term, as critics see it, is in the term "literacy." To them literacy can only refer to the mediation of language symbols. One does not read pictures therefore cannot be literate by using pictorial presentation. And they often go to the most commonly used source of scholarship, the dictionary. Of course they find great strength in the resource. "The quality or state of being literate, especially the ability to read and write."

We must however, quietly allow that the dictionary, no matter how helpful on incalculable occasions, is not the last source in communication theory or philosophy of language. To get to the comprehensive nature of the concept of literacy we must understand that literacy does indeed point to the mediation of symbols; to the 'reading' of symbols. The point overlooked by the questioning critics is that there is more than one category of symbol and types of symbols within these categories. Part of the key to understanding the theoretical context of visual literacy is to look carefully at one's concept of the nature of the symbol itself. As an introduction to looking more closely at the nature of the symbol, we will now try to develop a comprehensive look at the make-up of the concept of literacy.

SYMBOLS AND INTELLECT

A constant aim of people in life is to gain systematic control over all that they encounter. We constantly add to these cognitive, psychomotor

and emotional survival systems and a great deal of what we encounter in the world are symbols. Symbols are not only essential to living, but our actions themselves are symbolic systems and they are learned from symbolic systems. Intellect is that condition resulting from experiencing and intellect is encoded and retrieved by use of symbols. Thus basically we are symbol seeking and symbol generating creatures. It is true that mankind is primarily language oriented but also shares with other creatures non-lingual intellect.[7]

Mankind apparently transforms experiencing into electrochemical codes of varying complexity and levels of abstraction. We refer to these codes by various existential symbolic labels. We can count for at least two categories of knowledge that are encoded. In other words, these electrochemical codes are neutral transformations of existential symbolic situations. These codes are patterns of significance or patterns of meaning cued to our awareness when needed because the symbols (existential) are an integral part of the encoded meanings. We also accept at this point in research findings that a pattern of meaning is generally called a concept and that a concept is an ever growing system. This is done by the nervous system through encoding the cueing symbol as part of the mental pattern of meaning itself (electrochemical codes). The symbol for the concept is part of the meaning of a particular concept. By using this framework, the symbol being encoded as part of the encoded meaning, of relating symbol to what is symbolized,

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[7]Susanne K. Langer, Philosophy in a New Key (New York: Mentor Books, 1958), Chapters 1-6.

we can account for having two types of knowledge; a lingual and a non-lingual category. In other words, there are two types of knowledge encoded in our nervous system and these two types of knowledge are cued by two types of symbols. If we postulate two categories of symbols, there is an implication that they are different in some significant way.

If we are to use the concept represented by the term symbol then we must develop a concept at a level of abstraction that is inclusive of both categories. Such a requirement leads to the theoretical construct in which the symbol is simply but powerfully defined as "that which cues meaning.

LITERACY

If we use reading as a classic example of "literacy" (which most "probers" do) we are of course concerned with language symbols that cue meaning. To understand literacy in this context we must understand reading. Reading is a process. It is a communication process. When we decode ("read") the language symbols (words), we re-create a communication or a message from the writer (encoder) to the reader. How is information processed and conveyed from writer (encoder) to reader (decoder) who are separated in space and time? As an example, we will use the simple sentence, "The rocking chair is red."

If symbols are such that they serve to cue meaning, and words, oral and written are symbols, then we are lead to the realization if they cue meaning they must cue it from someplace. If we use the word "chair," we confront it in two forms, the auditory symbolic and the visual symbolic But the sounds that make up an oral symbol are, in fact, mere sound

impinging on the nervous system. In and of themselves they are meaningless. Mere ink marks on paper such as the word "chair" are basically just ink on paper that have a particular configuration. They do not embody meaning, nor are they vehicles of meanings. They are cues of meaning.

In the context of reading language systems, which only people do, the meanings are brought to the process to act as mediation elements. These meanings have been encoded in the nervous system in the form of concepts or patterns of significance which are cued by the language symbols. Such a process will be further elaborated below but at this time it is necessary that it be understood that language symbols (words), engage concepts as cueing mechanisms. As words are encountered, written or oral, they cue up meanings that already exist in people. We do not get meaning out of the printed page. This is so despite the many statements found in professional literature on literacy which state that "meaning" is the goal of reading the printed page. Such a distinction is not just a matter of semantics, it is a matter of semantics, psycholinguistics and being careful of one's conceptual or theoretical framework. That people interested in reading instruction have not been very concerned or careful of theoretical framework is documented by J. Chall (Learning to Read: The Great Debate, McGraw-Hill, 1967).

What do we get out of reading if we must "put" meanings into the process? The process of reading requires us to synthesize the meanings (not merely a cumulative collection) into a message or a unit of knowledge. In other words, to comprehend a symbolic configuration (a line of print) we look, see and perceive (give meaning to) the words. The visual image is processed by our nervous system so as to cue the concept

in our deep structure are organized, as we follow the discursive, linear lines of print, to fit a familiar syntax. Following the familiar syntax, we process the information into a synthesized whole; we have re-generated a message from the meanings that have been cued. In this way, concepts, can be used in a great variety of relationships to generate various kinds of messages. (See Fig.1).

Literacy, then, is basically the integration of units of meaning or significance into a greater complex of understanding that is a unit of knowledge.

Literacy is a process of symbolic mediation. Reading as a process is not just recognition of symbols; it is symbols perceived and processed to create a message. Recognition of symbols is only the beginning of the perceptual act.

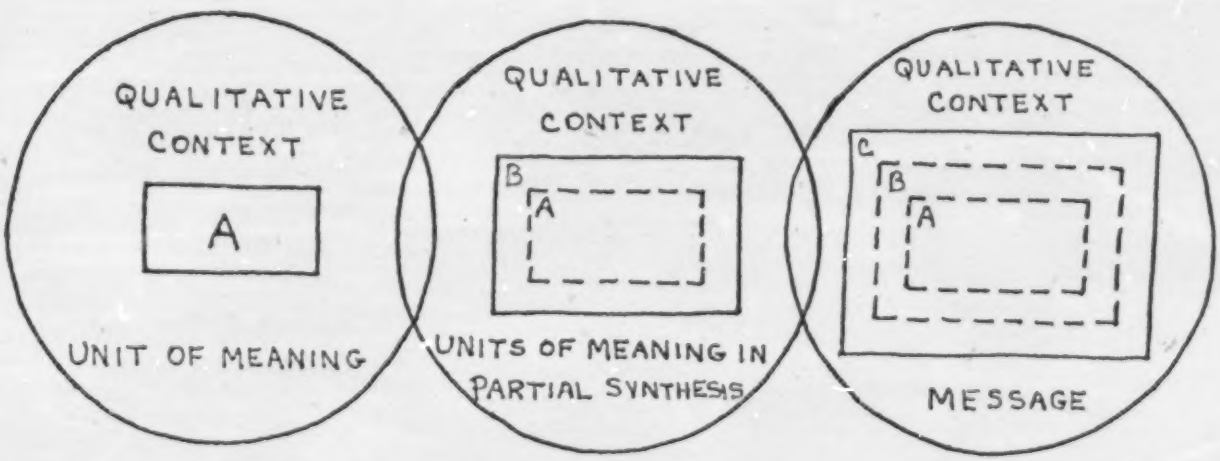

Fig. 1 Synthesis of Concepts to Form Message

In this manner, we can say that reading or generally, literacy, is not a passive process. The mediation process is an active one but receptive one; we are receptive of the stimuli but in fact, from our active process of mediation, we create the symbols. If we have no meaning to attach to the stimuli, the stimuli are not symbols. Symbols symbolize something. If they do not symbolize some unit of significance encoded in the nervous system they do not serve as a symbol to that particular perceiver. Dewey,[8] in discussing the nature of experiencing, tries to make this point.

> For to perceive, a beholder must create his own experience. And this creation must include relations comparable to those which the original producer underwent. They are not the same in any literal sense. But with the perceiver, as with the artist, there must be an ordering of the elements of the whole that is in form, although not in details, the same as the process of the organization of the creator of the work consciously experienced. . . . In both, an act of abstraction, that is of extraction of what is significant. . .into an experienced whole (is the objective). There is work done on the part on the recipient as there is on the part of the artist.

Literacy, in the sense of the reading act, is then, an ordering of symbols to create a total profitable, satisfying experience; to generate a unit of knowledge. It is an epistomological quest. We may characterize literacy then, as any process where there is a mediation of symbolic forms to create a unit of knowledge greater than the sum of the parts (meanings). Literacy, as a comprehensive concept, refers to information processing; to the mediation of symbolic forms.

As pointed to earlier, the 'visual' in "visual literacy" implies a much broader meaning of the concept than seeing language symbols.

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[8] John Dewey, "Having an Experience," Art As Experience, (Capricorn Books: New York, 1958) p. 54.

It points, of course, to processing other types of visual information. To call such processing 'literacy' one might ask if such a processing would include mediation of symbols other than language symbols?

To have such "literacy" as outlined above, we would have to have a symbol that operates (cues meaning) as symbols should act and be significantly different from language symbols. In order to develop a theoretical context for such a concept we first need to clarify the nature of the language symbol and its variations and then explore the possibilities of non-lingual symbolism.

THEORETICAL LINGUISTIC SYMBOLS

In order to be more precise in developing a theoretical understanding of visual literacy, we now introduce the terminology qualitative symbolic and theoretical symbolic[9] to label two types of knowledge. The theoretical symbolic is the lingual domain. This representational symbolic sector has two types of symbols. One is the theoretical auditory linguistic (TaL) or oral language.* TaL is the primary form of discursive (language)

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[9]The use of the terms theoretical visual and qualitative symbolic is to avoid confusions in communication. "Visual language" can be either theoretical visual as in the printed word "chair" or qualitative visual as in a picture of a chair. The term "verbal" does not help too much because of the well-known factors attached to the differences that a qualitative emphasis on theoretical auditory linguistic makes in the meaning. Such examples, together with ones in which the qualitative visual is used to reinforce the theoretical visual ("the pine tree" typed in the form of a pine tree) leads to the need for more precise teminology. For discussion of "Tone" see Paul Henle, ed. "Cognitive and Noncognitive," Language, Thought and Culture (Ann Arbor: U of M Press, 1966) p. 154.

*If you find it hard to help people understand the nature of visual literacy, please be aware that it is sometimes very difficult to get intelligent college juniors to understand that spoken words are symbols. They are brought up in a culture that emphasizes the visual nature of theoretical symbols. Visual literacy types ought to find some irony in such a situation when the psychological extension of this visual emphasis is rejected, or at least resisted by many who do not understand the basic symbolic nature of information processing.

communication. The secondary form is the theoretical visual linguistic (TvL) or the written form of the theoretical linguistic. The theoretical symbols are referred to as representational because they are symbols that represent something other than what they, themselves, the symbols, are. They represent concepts encoded in the nervous system. The concepts are categories of meaning with exemplars in the real world. Language symbols do not represent or "stand for" things; they represent abstractions called concepts.

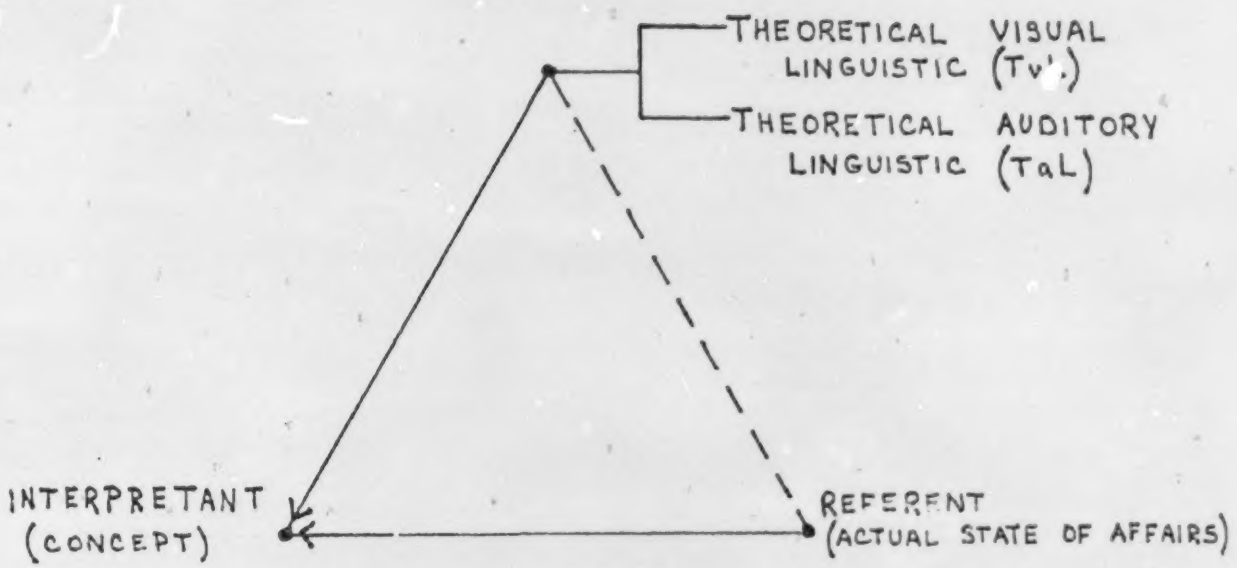

Fig. 2 Ogden and Richards Iconic Interpretation of C. S. Pierce's Triadic Construct on Lingual Meaning

For example, the theoretical symbol or word "chair" refers to a conceptual pattern of attributes (meaning) that is something other than what the term "chair," as printed or oral symbol is. Note, too, that the conceptual pattern of meaning is encoded in our nervous system as a form of knowledge; it is called theoretical knowledge because it is cued to our awareness by theoretical or language symbols. Also we may call such knowledge theoretical because the attributes can be named and communicated as a form of knowledge which can be learned through language.**

The meaning (concept) of the word "chair" and the actual object called "chair" are different from each other and both are different from the theoretical term "chair," either TaL or TvL. Thus we have the concept encoded in our intellects along with cueing mechanisms reflective of the oral and written words because in developing such an explanation of how language works, it is essential that the lingual symbol be encoded as one attribute of the attribute pattern of the concept. In this way, we are lead to see that we bring meaning to symbols because symbols cue the concepts within us.

In the theoretical domain, the relating of symbol and that which is symbolized is done through a definitional process (naming the attributes) representing the mental pattern of meaning. This is why C. S. Pierce[10] used the triadic construct (Fig. 2) to suggest that the nature

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**The attributes of chairness might be considered (a) it is manufactured (b) it is raised from the floor (c) it has a place to rest a singleton derriere (d) it has a place to rest a singleton back. The nervous system seems to do all this in an automatic, systematic way.

[10]C. S. Pierce, "Logic as Semiotic: The Theory of Signs," Philosophical Writings of Pierce, (ed.) Justus Buchler (New York: Dover, 1965) pp. 98-119.

of conceptualization would include experience with all three points of the trial. In other words, to know the meaning of a conceptual term (Theoretical Knowledge) such as chair, one must (a) know the symbol "chair" (b) develop a concept called an interpretant, which is the result of (c) having had experience with the actual object, event or situation (called a referent) represented by the symbol.

Dewey in discussing the differences between theoretical and qualitative symbolism attempts to clarify the function of theoretical symbolism by using the following analogical example.

> The problem in hand (difference between theoretical and qualitative symbolism) may be approached by drawing a distinction between expression and statement. . . The instance of a signboard may help. It (symbol attributes) directs one's course to a place (referent). It does not in any way supply experience of that city (referent as object event or situation) even in a vicarious way. What it does do is set forth some of the conditions that must be fulfilled in order to procure the experience.

Here Dewey is specifically referring to the objective, scientific denotative attributes of a concept that characterizes the lingual symbolism. There is a connotative or qualitative aspect of conceptualization or information getting, that is supplementary to the denotative aspects. We have now established the theoretical framework to be able to explain how the connotative or qualitative aspects of information processing by first looking at the denotational or lingual symbols.

It is quite apparent from the work of Piaget and other researchers that in man's intellectual structuring, the theoretical symbol, is the dominant symbolic sector. This is so because mankind, unique in the animal kingdom, is capable of conceptualizing the abstract knowledge and thinking is one of the things that makes mankind higher on the ladder

of dominance. Because of this abstracting ability, theoretical symbolizing has become the dominate form of information processing but not the only form or the only level of abstraction.

PART II THE PERCEPTUAL CONTEXT FOR THE QUALITATIVE SYMBOLIC

How do we come to know what we know?

Perception is one of the most important aspects of visual communication and has also been considered one of the central problems in psychology. Perception can be defined as "a meaningful awareness of objects in the environment." Aristotle had suggested the five qualitative senses of sight, sound, scent, taste, and touch. Today, after experimentation we know that man possesses at least a dozen including hot, cold, pain, equilibrium and muscular tone. These "senses" or perception are forms of knowledge that cannot be put into language.

The early Greek philosophers believed that objects themselves emitted something to the eyes that allowed an individual to see them. When the nature of optics was first being studied, we became aware that the object reflected light to our eyes, and similar to a camera, our vision "saw" a copy of the object. We now know that it does not always give an exact copy for the same impulses are sent along the optic nerve to the visual center of the brain. As this transmission progresses it is no longer the mechanics of vision but becomes the phenomenon of perception. The interpretation by the brain of the "picture taken" by the eye is where the individual takes over.

One of the most important parts of this phenomenon is called selection. Our selection is determined by what we are; what has happened to us in the past and what we hope will happen to us in the future. Because of our unique make-up we select what we want the brain to remember. It is possible to view an environment in many different ways. Sometimes it is based on the sequence in which events are viewed but it is always

cumulative; each perception based in part on a previous perception.

We give our own meanings to phenomena based on past experiences and sensations. As we respond to the symbolic aspect of the situation, we are also responding in an affective or qualitative way; responding with excitement or boredom, either happily or unhappily to the situation. The stimulation is done through the receptors.

The receptors are classified into two broad categories according to the type of information they bring to the individual. Sensory information within our own bodies are called propriceptors and interoceptors; while the exteroceptors are the receptors which give us information of the external world. The proprioceptors are located in the semicicular canals and vestibles of our ears as well as in the muscles and tendons of our bodies. The proprioceptors affect such things as various bodily positions, rotation, as well as stresses and strains on the various parts of our bodies. Bodily movement is propriceptive but the term propriceptive has given way to the term, kinaesthetic or "kinesis." Interestingly enough an emotion without movement can also be very vividly felt such as the grip of terror where one feels "rooted to the ground."

The interoceptors are in the viscera and concern the emotions. These types of knowledge cannot be communicated by language but are explained by the language of metaphors, i.e. "butterflies in my stomach," or "walking on air."

Knowledge of our bodily movements become so much a part of our lives that we rarely think of them other than in very general terms to state whether we feel "good" or "bad." When a great deal of physical energy is expended we do become more aware of the exertion particularly when it is contrasted with the needed and welcomed rest.

Exteroceptors include hearing, sight, taste, smell, and touch, all senses which have been expanded by mechanical inventions. The telescope allowed man to expand his vision to sights never seen before. The microscope on the other hand allowed man to see the finite world which is not readily seen with the normal eye. The television has extended the eye so we can see activities on the other side of the world and the telephone and radio have done much for the extension of the ear. Tools as an extension of the hand become the tactile facility to learn more of our visual world. This was made evident with man's landing on the moon where the astronauts were able to not only "touch" the surface, but were able to bring back some of the rocks and dust they found there.

Sensory experiences (qualitative knowledge) are usually not limited to one sense alone. The men on the moon used exteroceptors to touch the rocks, but they also needed the muscle control of proprioceptors to pick up and move about the lunar landscape. Muscle control is an active process which is significant in touching but not necessarily in being touched; it is part of the individual who is scratching but is not part of being scratched (other than the reaction).

Henry James said, "Every perception is an acquired perception"; it is not something with which we are born. We bring to our perception, our experiences (knowledge) with which we judge further experiences. Thus, our view of the world is dependent upon the capabilities of our senses. We consider a normal perception to be veridical, or true. There is, however, no real test for veridicality because the term veridical means more than true. It is a universal truth. It means

some identity between the object and its appearance to the perceiver. There can be no one specific test for veridicality because we all bring to the state of affairs our own individual experiences and knowledge. We 'read into' objects and situations qualities which we really cannot see; hardness or softness, heaviness or lightness, hot or cold. These perceptions come from experience and stored qualitative knowledge.

Individual perceptual learning is very important for associating non-optical properties of objects with their optical or retinal images. It is essential for perception for the totality of qualitative (non-lingual) and theoretical (lingual), knowledge gives us a complete concept of any one state of affairs.

The individual relies on the stored information in the brain to determine how certain stimuli behaved in previous situations. Then the individual selects the most appropriate hypothesis for what he is currently perceiving. The hypothesis is based on a combination of stimulus plus the observer's own experience. In this way, if the stimulus gives just a few clues, individuals can fill in the gaps from their storage of experience and complete the perception of the stimuli.

Can we ever be sure of what we see or be right or wrong about what we have previously seen? No two people can ever see exactly the same thing. But we do see in common the generalized essential attributes of states of affairs so as to be able to communicate. For each of us, our unique and individual environment combines the perceived world with the past bi-knowledge content of our intellect to form the present perception. Our perceptual world is everything we ever were or want

to become. Our literacy is really a generated and reorganized literacy and because we are mainly concerned with symbolic manifestations of knowledge, literacy is predominately visual.

The eye is quicker than the brain and more willing also. To become visually literate one must allow the eye to do its work and allow the brain time to operate within the "visual" context. Although the human eye is able to see a wide range of items within any single view, the focus is frequently on a very small segment of that view. An even smaller segment is that which is remembered. When one is reading a printed page the eye can view the entire page but in order to understand any part of the print they eye must narrow the view down to a single focus and work with each individual thought. Because the eye is similar to the camera in construction, we tend to think that the eye can and is as objective as the camera; taking the entire view and reproducing it into an objective print. However, the world is changed by our personalities and our backgrounds; what we value and what we need both phsyically and mentally, and our individual minds and egos. We must be aware of our bias and our attitudes which in turn do affect our perception. Time is needed to allow us to see the view and time is needed to look at each part; for as we take time to look we are also taking time to absorb and remember.

When we visit a museum or are traveling to a strange and foreign country we are often struck with how tired our feet become when in fact it is our eyes that have become tired and cannot absorb everything at such a fast rate of speed. In football even the most avid fan is delighted to see the instant replay for no matter how closely he has

been watching the game he has missed some of the action because the brain could not absorb everything so quickly.

Ink blots are abstract shapes which people reorganize to make meaningful. They become symbolic when meaning is attached. People are influenced by the ink blot tests because of what they have been taught, what they need, or what have been their previous experiences. We have been taught to make certain associations and give the same meaning to common symbols. This is the way in which people make use of symbols. A symbol stands for a concept instead of one single item. It could be the McDonald golden arches, the shape of the Coke bottle, the common stop sign.

Trademarks and logos are designed to suggest the product or corporation they represent. Lettering styles play an important part in the designs of trademarks. The strong, bold letters which we see on the bank stationary leads us to believe that this is a strong and substantial institution.

Not only the design of the letterheads, but the building that the bank is housed in is also a very massive, strong and substantial building. The banker himself looks very substantial and is considered a substantial part of the community. We bring these meanings to these symbols.

Are we viewed as individuals or as stereotyped groups of people? We may not know but we can become aware of our own perceptions. Our home, as well as the way we dress, as an indication of our own perception of our style of living and our perception of our appearance. Similarly the community in which we live is an indication of what we value. (Circumstances as well as money may be limiting factors but within a range of both, we can derive some idea of what influences us

and what we value as individuals by the reflection of how and where we live.) Economically there may be some limitations but whether the picture we hang on the wall is a $100,000 original or $2.00 print the quality is still inherent in the attitude of the occupant.

Thus, we can see that perception is an active process. All mediation of symbols is an active process. We see the same things each day that become so familiar that we soon take them for granted. We know that the highway goes all the way to the next town even though our sight does not allow us to see what is happening over the horizon. Our experience tells us that it is so. From this ability we are able to act with a great deal of security. We also make some misjudgments. We generalize from our limited experiences to the broader view of experiences to come. Perception depends as much or more on the context of the situation as any other factor. Because the car is smaller than the figure in the foreground of the picture, we assume that it is a toy, when in the context of its surroundings it may be a view from an open door-way where the car is parked out in the street. This is true of visual perception in actual objects as well as in relationships with people and social situations.

Optical illusions are a fascinating study because we are using visual stimuli in a confusing, nonusual way and the perceiver's brain becomes rather confused. Ambiguous figures are commonly misinterpreted because we fill in the wrong data. Even the "motion" pictures when seen in the theatre and at home on television are not moving at all but a rapid succession of still pictures in slightly different positions that give the illusion of movement. Visual illusions are good examples that what we see is not necessarily so.

PERCEPTUAL PROCESSING OF THE QUALITATIVE SYMBOLIC

All humans are deeply influenced by the values of the society where they live. Values are basically what we want and aspire to but they also include preconceptions, notions, and prejudices. Preconceptions are what we expect to see, effecting the perception to become what we want to see, thereby reinforcing our own preconceptions. When we know that the next class to be taught is a very 'good' class, then we are not surprised that they in fact act, or react as a very 'good' class. The school trouble-maker frequently continues in his role because we know what to expect and react to him accordingly.

Visual skill is shaped by cultural values. A change in thinking (interestingly enough this is often considered a definition of learning) can create an esteem or value of an observation. (The definition of creativity includes the ability of observation.) We need to know why things appear as they do and be able to derrive some understanding from it. Note that we bring meaning to the elements of a picture but the total configuration creates a totality greater than the sum of the parts which we call understanding.

We must also understand the character and capabilities of the eye; its systematic way of looking at things. We must develop an awareness of the natural world where we live and upon which we depend for our existence. True environmentalists are visually literate for they perceive not only what they see but frequently the relationships between the various elements. This is the true "understanding" of the environment. Jacques Cousteau is visually literate in that he understands his environment to such a degree that he can make others aware of individual aspects but an understanding of the whole.

To be visually literate one must have a concept of what is significant and turn one's attention to that significance. The advertising and mass communications fields have inundated our vision with so much trivia that our children instead of becoming mass consumers have become numbed, indifferent and perhaps worst of all, skeptics to the claims of the advertisers. We need visually literate students to recognize that which is significant based on what we value.

CURIOSITY

Curiosity plays a significant role in our perception. Parmenter considers four stages of curiosity beginning at the basic. At the lowest end is latent curiosity which is all but non-observable. Idle curiosity, the next step up, is observable but haphazard and irregular. The third stage is one of active and interested curiosity. The final stage is a curiosity that is all consuming and a constant interest to the individual.

Curiosity arouses inquisitiveness. This inquisitiveness precludes the gathering of knowledge. The basic activities of curiosity push us beyond the 'single level' of perception which is the normal everyday type of perception. Single level perception 'sees' the environment and situations at face value. "Double level' perception is more comprehensive because besides 'seeing,' the perceiver is also observing the context of the perception.

Curiosity needs time to observe; to look for, to find the unique, to question, and to read. (It sounds very much like the ideal graduate program.) The uncomfortable disquiet of not knowing fans the flame of curiosity. A condition definition of learning states that there must be an uncomfortable feeling within the individual to follow the quest

for knowledge. As learners, we need knowledge to aid in the piecing together of the visual aspects of information. In order to truly absorb a visual image we must think about it as we are seeing it, both actively and passively. We must be aware of our interest and also be interested in our awareness.

While we are assimilating the image we should allow our memory to operate. Remembering is a secondary element and not always pictorial. When we remember we can visualize either a remembered feeling or a recollection. We can have a train of thought induced by some slight cue. The phenomenon of de ja vu, where one has the feeling of having experienced a situation previously is due to the remembering ability of our visual capacities. We can combine both the knowledge and the imagination and really "visualize" situations where we could have never been or situations could have never really occurred. We may be able to imagine our parents' wedding day because we have combined the image of photographs with recollections of the old family home and can 'see' an event which we may never have physically attended.

Seeing is similar to studying in that it is a limited occupation. The mind can only absorb a certain amount before it becomes fatigued and is not able to assimilate any new knowledge.

> "On the whole, I have found my feelings fall into the same pattern of impact, scutiny, recollection and renewal. . . In the middle of the exercise my senses begin to tire and if I am to go on looking responsively, I must fortify myself with nips of information. One cannot enjoy the smell of an orange for very long, which in my case is less than two minutes, but one must look attentively at a great work of art for longer than that. . .As I remember the facts of a painter's life and try to fit the picture in front of me into its place in its development, my powers of receptivity are gradually renewing themselves and suddenly make me aware of a beautiful passage of drawing or colour which I should have overlooked had not an intellectual pretext kept my eye unconscioulsy engaged.[1]

[1]Clark, Sir Kenneth, Looking at Pictures, John Murray, 1960.

In learning and studying as in seeing and visualizing we go from the specific to the general; from the concrete to the abstract. The eye has a very short attention span and especially so when the eye has not been trained to be visually literate. We actually use our eyes more than other senses but we have also trained them less than the other senses.

If our curiosity is piqued on first viewing, then the second observation of the object we begin to use new ideas and visible cues. The interworking of curiosity, knowledge, and time (enough to assimilate) results in the expanded powers of apprehension. When we become more apprehensive we tend to learn more, for learning, too, is not a passive activity. Thus perception and learning, quite similar in form, are both active, intellectual happenings.

In a particularly intellectual climate there develops visual snobbery. Visual snobbery is a type of social prestige which develops among the intellectuals. In this group the highest prestige comes from having seen the article in question. If you can say that you have 'seen' it, it is much more important than having 'looked' at it. This type of snobbery, similar to most types of snobbery frowns upon that which is not valued. Art is the first and foremost of value within the visual snobbery group and if it is not art then it is not worthy of considering. The second quality to be valued is prettiness. Some visual snobs include in the list of valued items those with historical value. This type of snobbery is most often used in discussing and evaluating items, but it can, and is often used to evaluate and categorize people.

The 'art' person can be someone who is an artist or a specialist in any field. Some fields are more to be desired than others but a person who is an ambassador, a professor, or a corporation president is valued. They are the people chosen for bank board, school board, or symphony members and the most prestigious and honorary positions in the town. Secondly, if you are pretty (or handsome), you are valued for the pleasantness which you exude. Look at people in the advertising in magazines, newspapers, and television. And thirdly, if your parents or ancestors came to the United States on the Mayflower, your value is historical and must be special (even though many of the Mayflower passengers we considered undesirable in that time). These visual snobberies exist and result in a social snobbery which continues.

Contrary to what people believe, words are symbols just as pictures, drawings, and photographs. The average page contains 2,000 letters and the eye recognizes each letter in turn; first observing the words as a whole; then within the context of the word; the word in context of the sentence; and the sentence in context with the thought. We learn to read through training and this training is probably the only eye training most people receive. When we see a poster the first impulse is to read it rather than to look at the design of the letters and the drawings. We are primarily interested in what the words mean. If one looks at a book of foreign posters, sometimes through the design and color we can tell the meaning without understanding the words. A skillful artist can convey a message without words and frequently with a deeper understanding than with words alone.

Frequently we eliminate the visual appearance of letters when we cue the word meanings for them. If a story is particularly discriptive, we do not see the words but rather recreate the images the author has brought to mind as we read. From the printed page we create ideas, not words and meaning.

Color perception is not necessary for reading. Most printing is done in black and white. (Some experiments with eye-ease green and and other subtle color combinations have appeared from time to time but have not been as effective as originally thought to be.)

Reading is a skill that deciphers by using meaning. Visual perception absorbs all forms (color, texture, spatial use) of the display and discerns an overall perception that is derived from not only within the display but who, what, and how the observing person came to be. Because within a glimpse we can see so much it tends to make us feel overconfident in our vision. We begin to think that because our eye is similar to the camera we see everything and observe everything with the same intensity. We see much less than we have the power to see. This delusion leads to other misconceptions. We begin to think that seeing requires little time and can be accomplished in a short time span.

We begin to think that because our seeing is liked to the operation of a camera, and the result is similar to a photograph, that our seeing is objective; but the brain, because of natural selection admits some and excludes other parts of the visual field.

The point of view on an observation can and surely is different for most people; even when people seem to be in a similar circumstance. We bring to the perception that which we already know; based on age, social

background, ethnic background, and the way one is feeling physically at a given time. The eye is a mechanism which acts in one way, (similar to the camera) and the brain is a process that acts in another way (utilizing the memory bank of long and short term memory as well as the other sense observers).

We can be fairly certain that we all see the same thing whether we call it by the same name or not. The orange is on the table and you see it as well as I. What it means to me may be an attractive table decoration to liven up a rather dull kitchen; and you (since you missed two meals today) may see it as a delicious treat. The meaning is mediated by the individual.

Educators are not interested in having all people see the same, but we would rather want to develop a better understanding of each other by having a greater understanding of how individuals perceive.

> "To one child this agate will appeal because of the variety of colour tones; to another it will be the smoothness; to a third the oval shape which curves to the hand will stir his visual imagery. Is the teacher aware how greatly this experience varies from child to child and of its significance? It is this personal experience that has potential learning value."[2]

Perception is the basis for communication. Communication involves attitudes, knowledge, communication skills between individuals and the social and cultural context in which these attributes are located.

The adaptation-level theory (Helson, 1964) which purports that an object is judged relative to the objects around it. We do not see things as isolated bits of knowledge, but rather as a part of a whole which has bearing on every other part. It is part of what we see and part of what

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[2]Marcouse, Renee, Using Objects, Van Nostrand Reinhold Company, c1974, p. 27.

we have previously seen and come to know. We do not see things in isolation, either visually or within our mind. Therefore, it is not enough to know the physical characteristics of a stimulus to predict how one can perceive a single part. We must know the total context and any theory of perception must include the principle of context. We see something in one situation and soon after see the same subject in an entirely different situation, i.e. a basketball player viewed from the bleachers, appears quite small if he is six feet tall because in the context the rest of the team may be the smallest of the group. This same player seen on the street with an average group of students may in fact appear quite tall. The stimulus is the same but completely different context.

Eye movements are essential for perception. Upon a single viewing the viewer might be inclined to make errors, but as the observer continues to regard the view the reasons for distortions may become apparent and acceptable and eventually part of the judgmental process. Perception takes time.

> "The more practised and nimble the mind becomes in scanning the rush inflow of information from pieces that fit together in a jigsaw puzzle, the more skilled it is likely to become in productive thinking."[3]

Perception in its truest form is based on creative and productive thinking. We need the skills of visual literacy to allow a freedom of and non-conformity for creative endeavors and new horizons. We must look at old things in new ways, or look for new things in old ways.

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[3]Arnheim, R., Visual Thinking, Faber and Faber, 1970.

IMPACT ON EDUCATION

What is the impact on education? If we could completely understand perception, then we could use its laws as guidelines. We in education can see how very important perception is when so much of our life and all of our learning depends on it. When theoretical aspects of perception are not clearly understood there tends to be malpractice in which no one benefits.

From understanding the principles of percpetion, we must design instructional systems that help children learn about the nature of perception. There must be order so that people know what to expect and what is to be expected of them. Children must learn that in each new situation we must rely on our previous experience; what had seemed to work previously and the rest of the time guess at the new situation for the best way to proceed.

Children must learn that our perception comes from ourselves and not from things around us. Our own perception is made up of reactions and almost entirely of what we already believe. Children can learn that since there is frequently little relationship between the object and the perception we cannot be sure of what we are seeing let alone what anyone else is seeing.

> The name and the position we give to an object do not lie in the objects themselves, but is what we ascribe to them out of our past experiences. . .So what we call reality lies in each unique background and not in the objects which send the light rays.[4]

With these basic ideas we use every day without thought, children can learn to make out a great deal in the field of vision. What we select

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[4]Kelley, Earl C., Education for What is Real, Harper, c1947, p. 29.

and look at in this field of vision is what for the individual becomes reality. They can learn that reality is governed by our visual literacy. Children can learn that whatever we make of it, we are inclined to make it what we want it to be. We are not only bringing to the field of vision what we already know and are, but we are also selecting just what of that field we want to look at, and while we are looking at it, tending to make it just what we want it to be. Herein lies the very basis of visual literacy; for children must have a great backlog of visual experiences for only then, will they be able to get a headstart on perception. The more experiences children have (and these should be varied and purposeful experiences) the more understanding they can bring to each new situation. With understanding comes knowledge and as children generalize their learning not only grows but grows at a cumulative rate.

> If we say that the only reality is our perception, then there is no such thing as an illusion, the perception merely varies more or less from the environment. The only thing in the whole sequence that matters is the perception, since that tells us what the object is to us. . .To dismiss one of these misinterpretations as an illusion because it is unusually different from the object which started the chain of events is to place the importance on the object (which may be of very little importance) instead of the meaning extracted from the perception which is all important, since it is the meaning which governs what we do.[5]

What Kelley is saying is that it does not matter what we see or what the object actually is but rather how we are affected by it and in the end how it affects our actions. To reiterate; we are bringing to the field that which we already know, we are selecting what portion we want to look at, and while we are looking at it, we are making it and perceiving

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[5] Ibid., p. 33.

it as just what we want to see. When children are visually literate they get the most out of the object or display. The more they percieve, the more visually literate we become.

The implication is also that each of us has a style of learning and by selection we continue to use our own unique style. It behooves teachers to be aware of individual learning styles because by selection we continue to use that style which we have developed.

The consequences of this have little import if children are looking at a theatrical production but what if they are making all of these judgments, based on our meager knowledge and experience, of another individual. Children must be taught how and why they do this. We accept this responsibility when we sign the contract that says we will behave as professionals. We decide to a great degree what we want to teach and that for us is real and important.

> If a perception is not acted upon, it does not become important. Reality comes from what we make of our clues receiving by our sense organs, when we act upon them. Thus it comes about that it is impossible to consider any environmental matter apart form the experiencing organism. . .External objects only attain importance when assigned characteristics, distance and position by and experiencing organism.[6]

We can consider our perception an abstraction. An abstraction because when we view something we are actually seeing only what we already know; an interpretation of the state of affairs based on whatever we have experienced before. If we continue to live with abstractions alone, then we are living in an un-real situation. We cannot enlarge our perceptual field if we merely react to things which are already in it. For reaction is not adding anything to our knowledge or reality, it is simply a vicious

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[6]Kelley, Earl C., Education for What is Real, Harper, c1947, p. 40.

we must admit to a value. Value standards are certainly not the same to everyone even as our perception is not the same, in fact one could say because our perceptions are not the same. Because of our perceptions and reactions to our perceptions, we become what we do. That is in reacting we are reinforcing what we already are. So we come back to the vicious circle where we bring to the perception what we already know and what we already know, correct or incorrect, is reinforced by usage. These things children can learn.

To disengage the circle of introspective experience which narrowly guides our life style, we must turn to some form of learning. Learning is said to effect a change in behavior. Learning can occur all through our lives and for many people does. But in this discussion we are interested in formal education; that involving teachers and students in an interaction of perceptions and an exchange of experiences. We as educators must be willing and able to look beyond our own experiences so that we can deal with our students in an effective and effective manner.

> The most important factor in education then becomes the arrangements that the one to be educated makes with his environment through his senses, of which vision is the most important.[8]

We are so used to assigning some meaning to what we see. It is reasonable to assign some meaning to the people that we see also. We go into a classroom with some ideas of what qualities a good, interested student will have. We perceive those students which fall into that category in a positive way and perhaps ignore or negatively perceive the others. Here is an example of the perceiver not taking from the object what is

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[8] Kelley, Earl C., Education for What is Real, Harper, c1947, p. 52.

there but rather putting into the object what he has experienced and what has meaning for him. This is a frightening thought and one that could make a parent afraid to allow their child to be at the mercy of a stranger whose ideas and values they did not know or understand. But teachers are not in the classroom as casual observers. They must be educated to look for certain qualities in order to teach effectively and fairly.

> Our success as social beings depends upon the degree to which we can attain communion with our fellow men. This calls for an understanding of the nature of practical reality, and why an object cannot be the same as it is to you as it is to me. When I know this, I lose some of my cocksureness and begin to make allowances for other points of view, other drives, other purposes.[9]

Here again we can see how tremendously important perception is, because in that single word, we can almost (if we knew exactly how to look) see what a person is and what he will become. How we work within is a framework of reality, of the actions of ourselves and others based upon what we feel is important and valuable to us. This teachers ought to practice.

> If perceptions are directives for action, if reality is only achieved through action, and perceptions are never better than prognoses, then the teacher must proceed in light of these facts.[10]

We cannot say for certain just what the individual will see but we can make some predictions. Because of our past experiences and those of others who may have devoted a great deal of time to the problems of perception, we can determine, and with some degree of accuracy, just what most people will see and do see. If it is within our realm of experience we may believe it or be amused by how we can be fooled.

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[9] Kelley, Earl C., Education for What is Real, Harper, c1947, p. 55-56.

[10] Ibid., p. 57.

Here again we must bring that unseen phantom, which makes perhaps the greatest impact on perception, the purpose or value. We can see that having a definite purpose and valuing something is the basis for motivation. It may in fact determine what motivation really is.

> The purpose of the individual is essential to the process of extracting meaning out of surroundings through perception. . . So the meaning extracted from the scene is not only unique to the viewing person on account of this individual experiential background, but also because of unique purpose. This makes a perception double personal and subjective.[11]

With the uniqueness of each individual we cannot hope to have communication and in turn understanding unless there is an interaction between what we are and what another person is. For what we are is what we value and what we value is what we do. If in fact we do this, we not only allow for better understanding but do enlarge our perceptual field by understanding what the people around us are doing. Our perceptions become interactions and our interactions become a reason for education. We can share our perception and knowledge to fuse mankind with the past to the present and the future. Each generation need not begin at the beginning but build on that which has proven most valid and acceptable from the proceeding generation. We should allow ourselves enought time to look and look again, to decide from the cues we are getting, what the object is really saying. We must go beyond the first glance and give ourselves time to evaluate before we make lasting judgments. Since time is not always an infinite commodity we must be trained to use our visual literacy to get the most out of each encounter. When we can develop this skill we may be closer to getting the most out of each encounter. Not only have immediate gain but in order that the skill in perceiving as

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[11] Kelley, Earl C., Education for What is Real, Harper, c1947, p. 67.

well as the intrinsic value of the experience itself, can become part of our total perception and a step toward better communication for ourselves and our fellow man.

Upon this much good teaching and learning is based; this too sets the framework for understanding the nature of the non-lingual symbol as the theoretical foundation for visual literacy.

PART III THE QUALITATIVE SYMBOLIC

The qualitative symbolic is where symbol and that which is symbolized, are the same. There is no interpretant (in the conceptual sense) involved in relating the symbol and that which is symbolized. There is no need because they are the same and simultaneously presented.[1] But the "no need" criterion is not the main consideration. The qualitative symbol cues qualities and complexities of the world which we have learned and encoded and which cannot be put into language. These qualities and complexities are non-lingual knowledge of the world. We can only learn the non-lingual through firsthand experience and we know and process this information yet we cannot translate this knowledge into language. They are communicated by using the qualities or complexity themselves. The only modality that is capable of presenting this type of knowledge is the knowledge itself which is its own symbol. In other words the nature of a symbol can be expanded to one that includes the representational symbol (lingual) and the presentational symbol (non-lingual); one type more abstract than the other.

The encoding of the qualitative symbolic modality is most basic in human development. We start life becoming knowledgeable about the world through our non-lingual senses. We encode and recognize sounds, smells, touches, sights, tastes, movements and emotions as babies and start our store of knowledge. Piaget even points out that development of non-lingual mental images is the basis for lingual development.

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[1] Langer, Op. Cit., Chapter 4.

In this presentation, we will use Hill's[2] definition of qualitative symbols in an abbreviated form. The qualitative symbolic refers to that which presents itself and then re-presents to the awareness of an individual. In using the term qualitative symbolic we refer to a state of affairs where there is a union of symbol and referent. The knowledge of the symbolic form is encoded through direct experience and this knowledge is re-presented (recognized) when cued again by the symbol itself. Take the smell of natural gas as an example. Can you communicate in language the smell of natural gas? Certainly you can not. The smell itself is non-lingual knowledge. It is an example of that which presents itself. We develop the ability (encode the knowledge) to recognize the smell of natural gas because this experiencing has been encoded as awareness knowledge (not the smell) by the nervous system as a coded part of the intellect.

We cannot give a linguistic definitional meaning to the smell of natural gas. We may communicate the conditions for the smelling of natural gas, but we cannot communicate the "meaning" of the qualitative olfactory symbol, or any of the other qualitative symbols. We theoretically label them hard, rough, stinky, colorful, loud, sweet, etc., but this is not communicating the "meaning."

What do we say when asked what is red? It is a color which has many hues and tones. But other than waves of light, what is red? There is no language interpretant. What significance does red have to us as individuals brings a number of different answers. Red means stop. Red

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[2]J. E. Hill, Appendix A: "The Educational Sciences" and "Symbols and Their Meanings" (Oakland County, Michigan: Oakland County Community College Press: 1968) M.S.

means mad. A brown tie goes with my red shirt. These are connotative and not denotative.

In referring the denotative aspects of symbolism, we are pointing to the basic attributes of a concept represented by theoretical symbolism. To this basic pattern of significance, we add an effective response of emotions and feelings (connotative). Thus each theoretical category has a qualitative ring of significance which is a personalistic response. There is therefore an intersection of the theoretical and qualitative symbolic. But there is also an intersection of different abstraction levels (see Fig. 5) of the non-lingual categories. We find that the lowest level (of three different levels) of non-lingual symbolism (sense) can on occasion have a connotative response which is the effective or highest level of abstraction in the qualitative symbolic category.

For instance, we have different connotative responses to natural gas if (1) our mother died from natural gas (2) our grandfather just willed us a nation-wide natural gas pipeline system used by 38 states. All symbolic modalities (both lingual and non-lingual) have this possibility of cueing an affective response which is non-lingual knowledge. So there is not only overlap between categories of symbolism but there is also overlap within categories.

The most basic or less abstract qualitative symbols are related to the five sensory systems, i.e., qualitative auditory symbols, qualitative olfactory symbols, qualitative savory symbols, qualitative tactile symbols and qualitative savory symbols. These are the less complex qualitative symbols where there is a complete union between symbol and referent

(actual state of affairs). These basic non-lingual symbols compose the broad base for understanding that knowledge of the world can be processed and encoded in forms other than the lingual format. Such a bifurcated look (theoretical and qualitative) at knowledge provides one more concept in building the theoretical framework for understanding visual literacy as a type information processing.

In considering these qualitative aspects of the world, the qualitative visual symbolics are dominate but not alone in the composite thrust to win a complementary place, next to theoretical symbolics, in information processing at different levels of abstration. To understand the different types of non-lingual knowledge we need first to look at factors which influence our processing of this type of knowledge. Remember that a symbol is that which cues meaning or knowledge that we have stored and in discussing the non-lingual knowledge we often interchange the terms knowledge and symbol because at the existential level they are one and the same.

LEVELS OF ABSTRACTION

Theoretically basic to the understanding of visual literacy is to understand aspects of symbolic levels of abstraction. The perceptual psychologists have brought levels of abstraction to our attention in a general way when they postulate that:

> people are a product of their experiences (who) react to events according to how they see them at the moment of action (and) their behavior is a function of perception (making) learning a function of meaning.[3]

It seems clear that people profit from those experiences that are in a form with which they can generate significance or in a format that

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[3] _____., Perceiving and Behaving Perceiving, Behaving, Becoming. 1962 ASCD Yearbook, pp. 68-75. See also John Dewey, Experience and Education. (See also all of part II of this paper.)

cues meaning they already have. In most cases of learning (refer back to page one of this paper) there is a balance of two. Our ability to make sense out of the world is a function of the form in which it is presented to us. This "form" refers to the level of abstraction of the symbolism used, either theoretical or qualitative symbols. Paivio[4] helps us understand the nature of abstraction when he points out abstraction is:

> characteristic of stimuli (which) refers to the directness which the stimuli denotes particular objects or events (with decreasing) reference to characteristics of the particular. . . requiring the manipulation of spatially and temporally remote events. . .manipulation and integration of stimulus information not immediately available to the senses.

In other words, when the symbol, which used to symbolize a certain state of affairs, is more and more generalized (abstract) so as to include not only the particular object, event or situation but others within a wider and wider category, it is more and more abstract. Abstraction can be effected in two ways that are closely interconnected. First of all, Bruner's[5] translation of Piaget's work, postulates that the world can be presented in at least three general levels of abstraction. (Fig. 3)

The symbolic level of abstraction (theoretical symbolism) is the highest level.[6] At this level there is no relationship between the form of the symbol and the form of the state of affairs symbolized. This

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[4]Allen Paivio, Imagery and Verbal Processes. (New York: Holt, Rinehart and Winston, Inc., 1971) pp. 16-17.

[5]Jerome Bruner, Toward a Theory of Instruction. (Cambridge: Harvard University Press, 1966) pp. 10-15.

[6]Bruner uses "symbolic" in his framework and makes no reference as to whether he considers the other forms of presentation to be symbols. In this paper, we follow the sematic framework that all forms that cue meaning are symbols of various levels of abstraction.

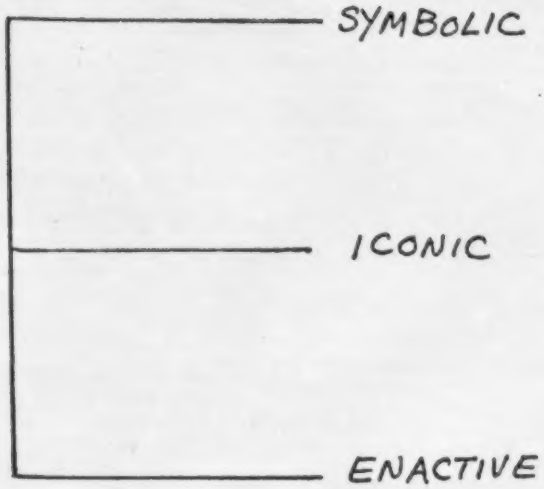

Fig. 3 - Levels of Abstraction Suggested by Bruner

abstraction is representational because the symbol represents the concept for the category not specific exemplars of the category. There must be established a relationship between the abstracted attributes of the concept and the symbol (the symbol becomes one of the attributes of the concept.)

Hayakawa[7] suggests that even the symbolic level of abstraction has aspects of abstraction. Some theoretical or language symbols are more abstract than others. One could go from a less abstract word like "house" to a more abstract world like "truth." One is also able to raise the abstraction level of theoretical symbols and still include the original referent. Hayakawa uses the following example as raising the level of

[7]Paul R. Wendt, "The Language of Pictures," The Use and Misuse of Language, S. I. Hayakawa, (ed.). (New York: Fawcett World Library, 1967) pp. 175-183.

abstraction. One can go from talking about Bessie the cow as a specific animal to talking about cows in general, to referring to livestock, to farm assets, to assets in general to wealth. Wealth is far more general and abstract and is inclusive of Bessie and all others in the hierarchy.

The representational (theoretical) symbolic, both auditory and visual, gives us no cues as to what it represents. It is highly abstract. As we lower the level of abstraction what we gain are cues and elements as to what referent is. The symbolic form changes from representational to presentational. In other words, the presentational symbolic modality (iconic and enactive) brings more information as to the nature of the referent to the perceiver. In providing more cues as to the referent, it is less abstract. It is this lack of abstractionness that gives the visual modality its great pedagogical power.

As Wendt[8] wants us to understand when he compares the nature of the word and the nature of pictures, there are differences and there are similarities.

> Of course pictures provide us with more cues from reality itself, cues for eliciting the meaning we bring to the picture, (more) than the arbitrary hen tracks we call "words." But the basic error is to fail to realize that the meaning of pictures are not in the pictures, but rather in what we bring to them. (183) We realize that pictures, although somewhat better than words, are only maps of the territory (192). . .Pictures. . .extend from absorbing realism to a fairly high level of abstraction (176). Always it is important to remember pictures, like words, are merely surrogates for reality, not reality itself. (177). . . Every photograph is an abstraction of an object or event. (178) the photographer sees to it that his abstracting preserves those features he wants to present to the picture-reader. (178)

In other words, even at the iconic (pictorial) level of abstraction, where there are far more cues to meaning than words give us, but still there are levels of abstraction within the visual modality. These levels of abstraction are functions of the number of cues provided. The more pictorial, the more graphic, the more cues that are presented the more

[8]Ibid.

iconic it is and thus less abstract. It is quite clear that visual presentation cues meaning in the conceptual sense by being a short cut to the interpretant (concept). Instead of dealing with the theoretical symbol in the symbol, interpretant referent triad, (see Fig. 2) we go directly to the referent. The referent (pictorial presentation of) becomes the symbol (qualitative) for the concept. This visual translation of the referent is used sometimes to cue the theoretical symbol (as in the use of picture clues in beginning reading materials) because it is less abstract and gives more cues as to the referent. The less the number of cues, even in the pictorial form, the less likely it will be a symbol for the referent (as in "abstract" art).

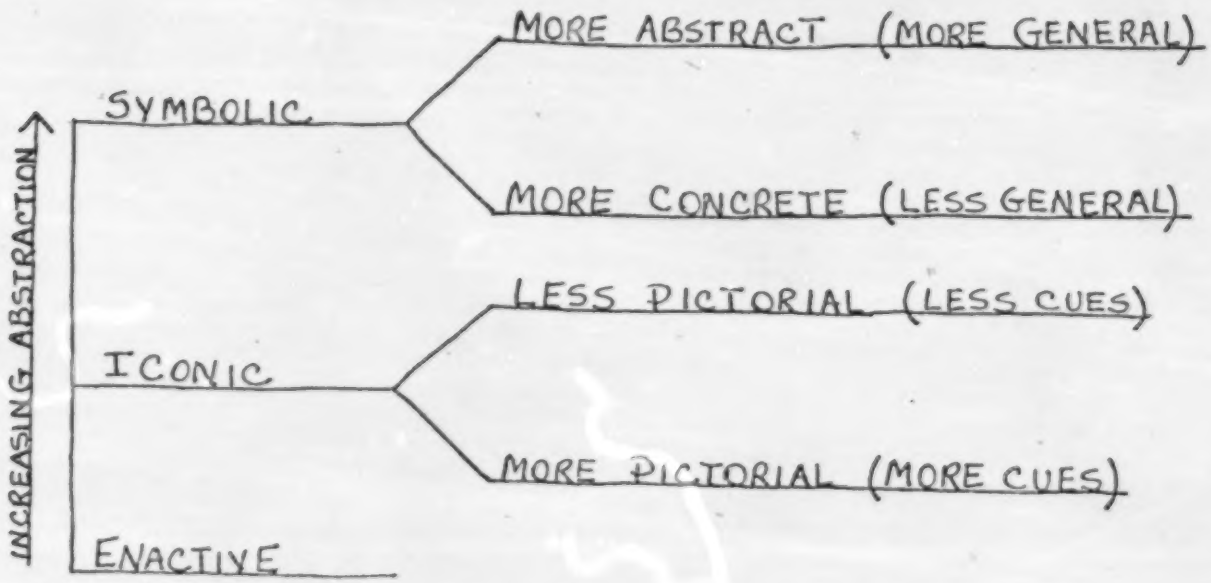

Fig. 4 Levels of Abstraction Within Levels of Abstraction

Wendt[9] goes on to tie the two types of symbolism, theoretical (representational) and qualitative (presentational) together within the perameters of meaning.

> General semanticists know it is hard to make the average person realize that he brings meaning to the word, that the word does not contain any meaning. A word is just a series of hen tracks which we are told authoritatively stands for a certain concept.
>
> It is still harder to convince anyone that we also bring meaning to a picture. If the picture is well within our previous experience it means something. What it means depends on the kind of experience. . .when the picture is not within the range of our experience, we react to it almost as little as to an unknown word. . .the difference here between words and pictures is that the distinction between the known and the unknown is sharpened by pictures.

Visual literacy then, deals with symbols, as pointed out earlier in this paper, but with presentational, or qualitative symbols that are characterized by presenting an array of cues which function to bring to awareness the meaning associated with the symbol. This cueing function serves to cue meanings associated with both qualitative or theoretical symbols. This is one reason why visual literacy can be so powerful in pedagogical situations. Perhaps the crucial aspect to be understood in developing a theoretical context of visual symbols is that they are just one type of non-lingual symbol that can be processed by the nervous system. They are not alone. They are not unique in the non-lingual information processing that we do.

At the lowest level of abstraction in qualitative symbols is the enactive level (see Fig. 3). At the enactive (sense) level, the world is presented to us as it is, the actual state of affairs. We experience the world with its totality of cues; the object, event, or situation is the symbol for itself.

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[9] Wendt. op cit., p: 181.

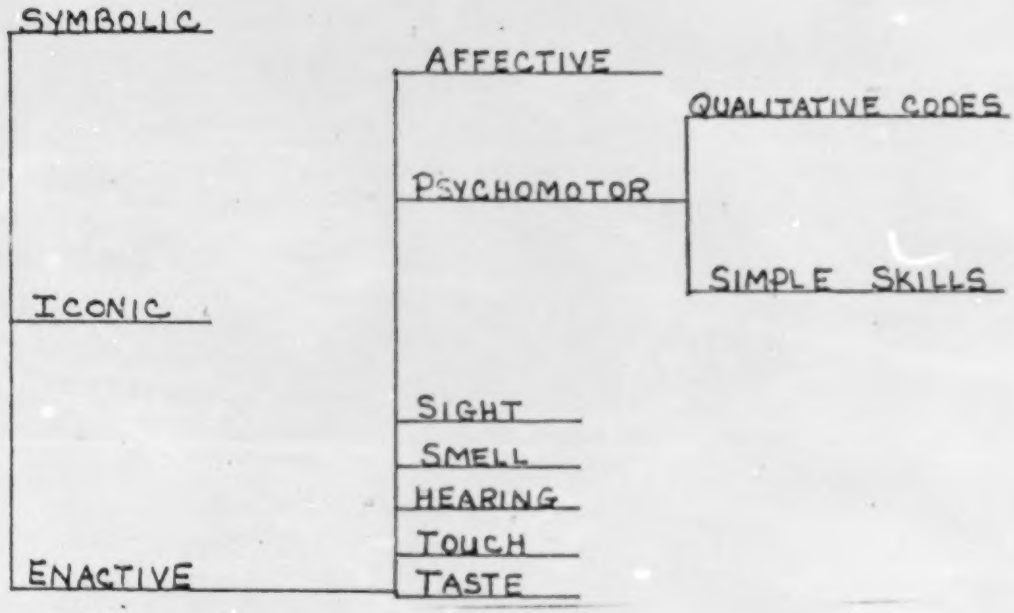

Fig. 5 Levels of Abstraction in Presentational Symbolism

At this point we see three additional levels of abstraction at the enactive level with different types of presentational symbolism. Thus, again, within a category we have finer distinctions as to abstractive levels.

These three different levels present themselves as symbols at a low level of abstraction, thus providing a maximum of cues to meaning, which has been or will be encoded in the nervous system and is based on experience.

The senses are the lowest level of presentational symbolism. We touch, taste, hear sounds, smell and have immediate stimuli impinging on our nervous systems that is encoded and can be recognized when re-experiencing the stimuli. We also see colors and forms and encode them. We

have had direct experience and have processed and stored the information as non-lingual knowledge.

It will be noted in Figure 5 the iconic level of abstraction is at a higher level than the sight (or visual) level at the enactive level. The differences in level of abstraction again points to the number of cues to meaning that are provided by the stimulus. It also points to the complexity of the state of affairs. At the enactive level (sight) we refer primarily to colors, where the number of required cues is one and one is indeed provided. Here touch or smell or taste or seeing is a wholistic experience, all or nothing, one cue is all that is needed to cue meaning and indeed one is provided to the respondent. At the iconic level the cueing system becomes more complex. It is these cue systems[10] that is the heart of visual literacy.

It is this complexity referred to when discussing visual literacy. If we think back earlier in this paper to the discussions of literacy, (Part I) we will remember that "literacy" pointed to the generation of a message created by the synthesis of meanings (see Fig. 1) that are cued by symbols. The model in Fig. 1 presents the process involved in literacy, either representational or presentational symbolism (see Wendt Footnote 9). A visually literate person is a person who understands the cueing systems (types of relationships) used in iconic or pictorial presentations to generate a message. This is a skill, like learning to read is a skill based on one's knowledge of the cueing systems of natural language.[11] The key to developing visually literate people is first of all determining whether we can tap a natural visuality in people that is

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[10] E. B. Smith, K. S. Goodman et. al. Language and Thinking in the Elementary School. (New York: Holt, Rinehart and Winston, 1970) Chapters 15 and 16. (Also 2nd ed., 1975).

[11] Ibid.

somewhat akin to the natural language context in which theoretical visual literacy is learned. Is there a natural visuality based on the dominate visual modality used in early childhood which can be brought to an intellectualized (awareness) level and used by people to generate and understand messages in visual modalities? Such knowledge of cueing systems in the qualitative visual symbolic would be needed to develop instructional strategies in helping people become visually literate.

At the next level of complexity of non-lingual symbolism growing out of the enactive level of abstraction is the psychomotor level of complexity. There are two factors to be considered in looking at this level of complexity.

One can only learn a skill by actually doing the skill. It cannot be transferred, like theoretical knowledge, from one person to another. The "learning by doing" slogan in pedagogy certainly applies to the psychomotor complex of non-lingual knowledge. One cannot learn to play championship golf by reading books on championship golf. It may help guide us, but the skill is developed by doing it. Simple skills would be one level of abstraction. Another level would be what Hill[12] calls the qualitative codes. These are behavioral patterns developed by people which communicate to themselves or to others an interpretation of the world. It is sometimes referred to as "games" or "body language." Hill points out that:

> Qualitative codes have a unique logic, involving distinctive patterns (mosaics), characteristic orders and relationships. As forms of meanings they are not random, disconnected entities, but neither does their organization tend to follow the necessary sequential patterns of theoretical symbolic rationality. In this context, qualitative symbols are sometimes mistakenly thought of as nonrational expressions of expressive forms, such as emotions.

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[12]Hill, op cit., "Qualitative Codes"; See also Anita J. Harrow, A Taxonomy of the Psychomotor Domain (New York: David McKay, 1972) this book not only includes the psychomotor level of complexity, but the sense level of complexity.

These "codes" are learned as a natural part of our cultural context and are part of the natural literacy referred to earlier. (See Appendix A for an enumeration of these codes.)

Also at the enactive level of abstraction is the emotions level of complexity in the qualitative symbolic. We exhibit emotions to ourselves and to others in the form of behaviors and covert feelings. Such manifestations of meanings are qualitative symbols of our responses to selected stimuli. We have not explored this area to a great depth but a great deal of work is being done in this area. Certainly a beginning to understanding levels of abstraction in this area would be Bloom's[13] taxonomy of the affective domain.

We have mentioned Dale's cone of experience as being one of the early and brilliant attempts to look at the one of the fundamental theoretical concepts underlying the use of non-lingual symbolism in instruction. His ladder of abstraction represented by the levels of experiencing has not been used to great profit in helping teachers understand the various facets involved in information processing and instructional implications of abstraction.

At this point in the cone still holds up to valid research findings in all except one area. Dale suggested at the top of the abstraction was the verbal symbolic in which he meant both theoretical auditory linguistic (TaL) and theoretical visual linguistic (TvL). We now realize that there is a difference in abstraction between the auditory and the visual as a function of whether it is creative or receptive in nature. At the lowest

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[13] D. R. Krathwohl, B. S. Bloom and B. B. Masia, Taxonomy of Educational Objectives: Affective Domain. (New York: David McKay, 1964).

Fig. 6 Dale's Cone of Experience

level would be the auditory receptive or listening to oral language. This is suggested by Dale's ninth level where he has Tal-Receptive (Tal-R) in the same abstraction level as still pictures. After this would come theoretical auditory linguistic - creative (Tal-C) which would be talking about a topic. Next would come TvL-R. This would be reading about a certain topic. Then the highest level of abstraction in the use of theoretical symbolism would be the Tvl-C or writing about a selected topic. In other words, in instructional development, using the theoretical concepts of meaning, abstraction, qualitative symbolic, theoretical symbolic, cue systems and complexity, it would seem that we would take into consideration the experiential or meaning background of the student. Start with experiences with a qualitative symbolic emphasis, possibly at the enactive level

of abstraction, go through various levels of complexity and finally to the theoretical symbolic level at various levels of complexity.

Such a systematic look at instructional development depends to a great extent on the theoretical or explanatory framework of a developer and this framework should include the rich context of visual literacy that had a limited presentation in this paper.

APPENDIX A: QUALITATIVE CODES*

1. Qualitative code-empathetic ($^{Q}_{cem}$' $^{q}_{cem}$) - the ability to identify with, or have a vicarious experience of, another person's (or persons') feelings, ideas, or volitions. This ability is most frequently demonstrated by the "empathizer" executing gestures, gesticulations and bodily movements supplemented by facial expressions that are sympathetic with the mood and/or bodily movement of the other person.

2. Qualitative code-esthetic ($^{Q}_{cws}$' $^{q}_{ces}$) - the ability of the individual under consideration to view with enjoyment the "beauth" and "pureness" of a resulting product, situation or idea.

3. Qualitative code-ethic ($^{Q}_{cet}$'$^{q}_{cet}$) - a commitment to a set of values, a group of moral principles, obligations, and/or duties.

4. Qualitative code-histrionic ($^{Q}_{ch}$' $^{q}_{ch}$) - artificial behavior, staged conduct, or a deliberate exhibition of emotion or temperament to produce some particular effect in, or evoke responses from, other person.

5. Qualitative code-kinesics ($^{Q}_{ck}$' $^{q}_{ck}$) - the ability to communicate by means of nonlinguistic functions and motions of the body, such as blushes, shrugs, gesticulations and gestures.

6. Qualitative code-kinesthetics ($^{Q}_{ckh}$' $^{q}_{ckh}$) - motor skill abilities and bodily reactions such as threshold of awareness (limen) of different weights, athletic performances, ballet, and finger dexterity. For information regarding the process employed to determine major and minor orientations of this qualitative symbolic code, see the explanation associated with the qualitative code-empathetic symbol.

7. Qualitative code-proxemics ($^{Q}_{cp}$' $^{q}_{cp}$) - the ability of an individual to judge "critical" physical and social distances between himself and others in the act of communicating. It should be noted that this symbolic code pertains to the individual's ability to judge and effect the type of social distance (e.g. closeness, estrangement) he wishes to maintain between himself and others. In most cases, the "permissible" physical distance people maintain between them during conversations is a culturally-determined phenomenon.

8. Qualitative code-synnoetics ($^{Q}_{cs}$' $^{q}_{cs}$) - personal knowledge of oneself in all qualitative and theoretical symbolic forms which constitute the totality of the individual in relation to his environment.

9. Qualitative code-transactional ($^{Q}_{ct}$' $^{q}_{ct}$) - the ability to maintain a positive communicative interaction which significantly influences the goals of the persons involved in that interaction.

* Hill, Joseph E. Qualitative Symbols, 1959, (M.S.), Oakland County Community College, Oakland County, Bloomfield Hills, Michigan.